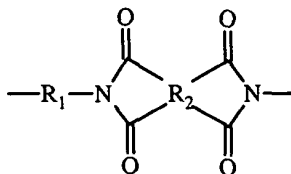


What is claimed is

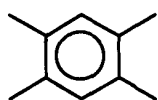
1. A membrane for gas separation comprising a blend of at least one polymer of a Type 1 copolyimide and at least one polymer of a Type 2 copolyimide in which the Type 1 copolyimide comprises repeating units of formula I



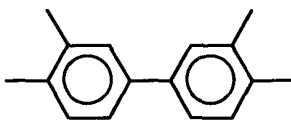
5

(I)

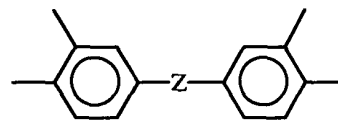
in which R_2 is a moiety having a composition selected from the group consisting of formula A, formula B, formula C and a mixture thereof,



(A)

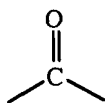


(B)

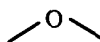


(C)

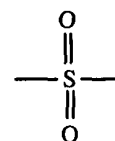
Z is a moiety having a composition selected from the group consisting of formula L, formula M, formula N and a mixture thereof; and



(L)

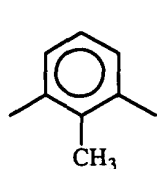


(M)

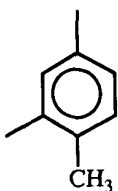


(N)

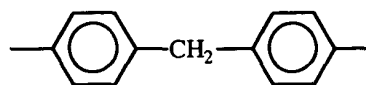
10 R_1 is a moiety having a composition selected from the group consisting of formula Q, formula S, formula T, and a mixture thereof,



(Q)

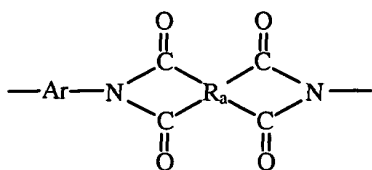


(S)

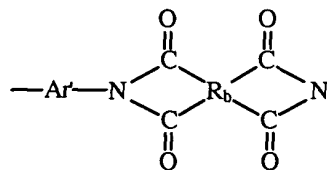


(T)

in which the Type 2 copolyimide comprises the repeating units of formulas IIa and IIb

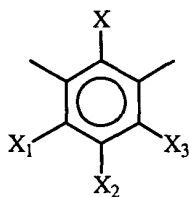


(IIa)

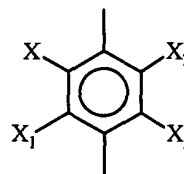


(IIb)

in which Ar is a moiety having a composition selected from the group consisting of formula U, formula V, and a mixture thereof, and



(U)



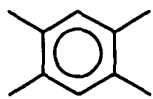
(V)

in which

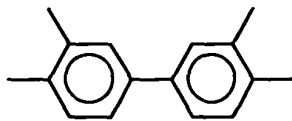
- 5 X, X₁, X₂, X₃ independently are hydrogen or an alkyl group having 1 to 6 carbon atoms, provided that at least two of X, X₁, X₂, or X₃ on each of U and V are an alkyl group,

Ar' is any aromatic moiety,

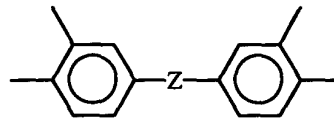
- R_a and R_b each independently have composition of formulas A, B, C, D or a
10 mixture thereof, and



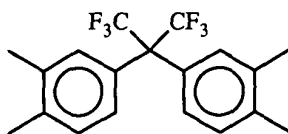
(A)



(B)

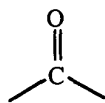


(C)



(D)

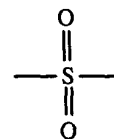
Z is a moiety having composition selected from the group consisting of formula L, formula M, formula N and a mixture thereof.



(L)

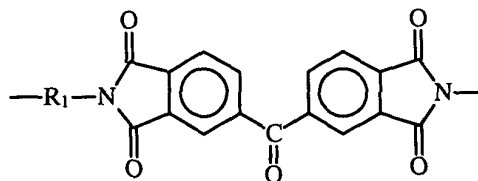


(M)



(N)

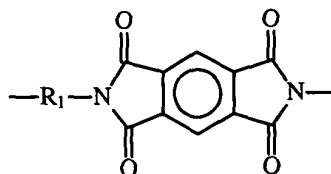
2. The membrane of claim 1 in which the Type 1 copolyimide comprises
5 repeating units of formula Ia.



(Ia)

3. The membrane of claim 2 in which R_1 is formula Q in about 16% of the repeating units, formula S in about 64% of the repeating units and formula T in about 20% of the repeating units.

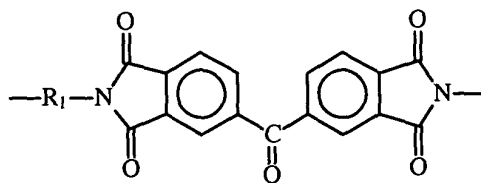
4. The membrane of claim 1 in which the Type 1 copolyimide comprises
5 repeating units of formula Ib



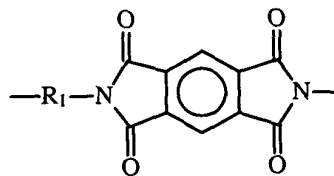
(Ib)

5. The membrane of claim 4 in which R_1 is a composition of formula Q in about 1-99 % of the repeating units, and of formula S in a complementary amount totaling 100 % of the repeating units.

6. The membrane of claim 1 in which the Type 1 copolyimide comprises
10 repeating units having composition of formula Ia and repeating units having composition of formula Ib



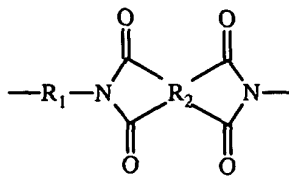
(Ia)



(Ib)

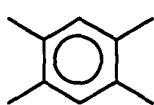
in which units of formula Ib constitute about 1 – 99% of the total repeating units of formulas Ia and Ib and in which R_1 is a composition of formula Q in about 1-99% of the repeating units, and of formula S in a complementary amount totaling 100% of the
15 repeating units.

7. The membrane of claim 6 in which the moiety R_1 has a composition of formula Q in about 20% of the repeating units, and of formula S in about 80% of the repeating units, and in which repeating units of formula Ib are about 40% of the total of repeating units of formulas Ia and Ib.
- 5 8. The membrane of claim 1 in which the ratio of Type 1 copolyimide to Type 2 copolyimide is greater than about 0.2.
9. The membrane of claim 8 in which the ratio of Type 1 copolyimide to Type 2 copolyimide is greater than about 1.0.
- 10 10. The membrane of claim 1 in which repeating units of formula IIa are at least about 25% of the total repeating units of formula IIa and IIb.
11. The membrane of claim 10 in which repeating units of formula IIa are at least about 50% of the total repeating units of formula IIa and IIb.
12. The membrane of claim 1 in which the Type 2 copolyimide is formed by polycondensation of an aromatic amine selected from the group consisting of 2,4-
15 diaminomesitylene, 3,7-diamino-2,8-dimethyldiphenylsulfone and a mixture thereof, and a dianhydride selected from the group consisting of pyromellitic dianhydride, 3,3',4,4'-diphenylsulfone tetracarboxylic dianhydride, 3,3',4,4'-biphenyl tetracarboxylic dianhydride, 4,4'-(2,2,2-trifluoro-1-(trifluoromethyl)ethylidene)bis(1,2-benzene dicarboxylic acid dianhydride) and a mixture thereof.
- 20 13. The membrane of claim 1 in which the membrane is an asymmetric membrane.
14. The membrane of claim 13 in which the membrane is a hollow fiber.
15. A method of separating one or more gases from a gas mixture comprising
25 (a) providing a gas separation membrane comprising a blend of at least one polymer of a Type 1 copolyimide and at least one polymer of a Type 2 copolyimide in which the Type 1 copolyimide comprises repeating units of formula I

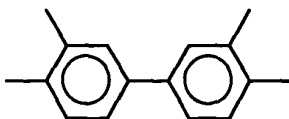


(I)

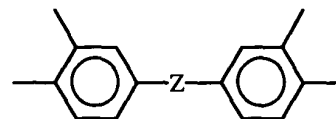
in which R_2 is a moiety having a composition selected from the group consisting of formula A, formula B, formula C and a mixture thereof,



(A)

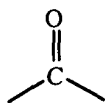


(B)

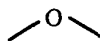


(C)

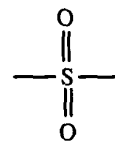
Z is a moiety having a composition selected from the group consisting of formula L, formula M, formula N and a mixture thereof; and



(L)

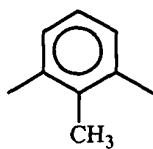


(M)

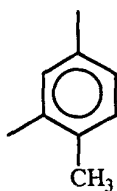


(N)

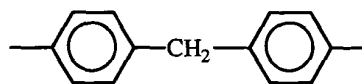
- 5 R_1 is a moiety having a composition selected from the group consisting of formula Q, formula S, formula T, and a mixture thereof,



(Q)

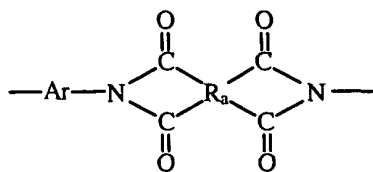


(S)

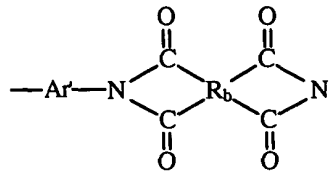


(T)

in which the Type 2 copolyimide comprises the repeating units of formulas IIa and IIb

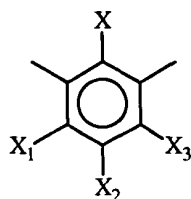


(IIa)

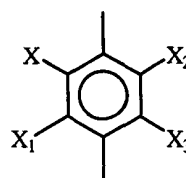


(IIb)

in which Ar is a moiety having a composition selected from the group consisting of formula U, formula V, and a mixture thereof, and



(U)



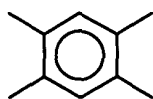
(V)

in which

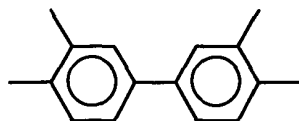
X, X₁, X₂, X₃ independently are hydrogen or an alkyl group having 1 to 6 carbon atoms, provided that at least two of X, X₁, X₂, or X₃ on each of U and V are an alkyl group,

Ar' is any aromatic moiety,

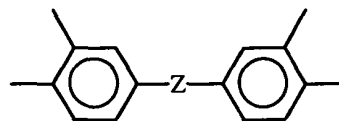
R_a and R_b each independently have composition of formulas A, B, C, D or a mixture thereof, and



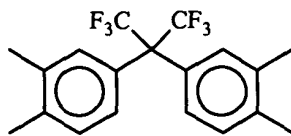
(A)



(B)

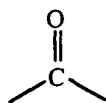


(C)



(D)

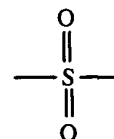
Z is a moiety having composition selected from the group consisting of formula L, formula M, formula N and a mixture thereof,



(L)



(M)



(N)

(b) contacting the gas mixture with one side of the gas separation membrane
 5 thereby causing more preferentially permeable gases of the mixture to permeate the
 membrane faster than less preferentially permeable gases to form a permeate gas
 mixture enriched in the more preferentially permeable gases on the opposite side of
 the membrane and a retentate gas mixture depleted in the more preferentially
 permeable gases on the one side of the membrane, and

10 (c) withdrawing the permeate gas mixture and the retentate gas mixture
 separately from the membrane.

16. The method of claim 15 in which the Type 1 copolyimide is P84, P84-
 HT325 or a mixture of them.

17. The method of claim 15 in which the gas mixture comprises carbon dioxide
 15 and methane.